

Partial English Translation of JP Laid-Open 61-128071

Means for Solving Problems

A condenser for cooling gaseous acetone and hydrogen from a distillation tower for condensing acetone and separating it from hydrogen is installed and a separation tower for evaporating the liquid-state acetone from the condenser is also installed and a hydrogen gas holder, a liquid-state acetone storage tank, and a liquid-state isopropanol storage tank are installed for hydrogen, acetone, and isopropanol, respectively. That is, the constitution of the present invention provides a chemical heat pump using isopropanol as a reaction substance and comprising a condenser for introducing acetone and hydrogen into from a distillation tower and condensing the acetone; a hydrogen gas line for supplying the hydrogen separated by the condenser to the low temperature side inlet of the heat exchanger; a separation tower for introducing the liquid-state acetone from the condenser into and evaporating the acetone by heat of a reaction product and an un-reacted substance from the high temperature side of the heat exchanger; a blower for supplying the gas-state acetone evaporated in the separation tower and the un-reacted substance to the low temperature side inlet of the heat exchanger; a pump for supplying a portion of the liquid-state acetone condensed in the condenser to an upper part in the inside of the distillation tower and a portion of the remaining to an upper part in the

inside of the separation tower; and a pump for supplying the isopropanol condensed in the separation tower to the distillation tower and is characterized in that the chemical heat pump is further provided with a hydrogen gas holder for temporarily storing and discharging the hydrogen gas from and in the hydrogen gas line; a liquid-state acetone storage tank for temporarily storing and discharging liquid-state acetone from and in a liquid-state acetone line for supplying the liquid-state acetone to the separation tower; and a liquid-state isopropanol storage tank for temporarily storing and discharging liquid-state acetone from and in a liquid-state isopropanol return line for supplying condensed isopropanol to the distillation tower from the separation tower.

Effects

The gaseous acetone and hydrogen from the distillation tower are introduced into the condenser and the acetone is condensed and separated from hydrogen and the separated hydrogen is supplied to the low temperature side inlet of the heat exchanger. On the other hand, the acetone condensed in the condenser is sent to the separation tower and evaporated by the heat from the reaction product and the un-reacted substance from the high temperature side of the heat exchanger and then supplied to the low temperature side inlet of the heat exchanger. The liquid-state isopropanol condensed in the separation tower is

turned back to the distillation tower. Accordingly, in a dehydrogenation reactor, a hydrogenation reactor, and a heat exchanger, prescribed reactions and processes are carried out respectively as conventional manner. Further in the case fluctuation occurs in the waste heat side or the heat use side, depending on the degree of the fluctuation, the respective substances are separately stored in or discharged out of the hydrogen gas holder, the liquid-state acetone storage tank, and the liquid-state isopropanol storage tank. Accordingly, waste heat can constantly rationally be used.